NEWS RELEASE

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UNH Receives Patent for “GlycoTrap”

New tool for study of carbohydrates could aid drug research

DURHAM -- While many dieters are trying to *cut* carbs, a University of New Hampshire (UNH) biochemist has invented a way to *capture* them so scientists can more easily study their structure.

UNH was issued a patent for the “GlycoTrap,” which separates carbohydrates from other tissue components, on March 23. The new research tool was invented by Vern Reinhold, Director of the UNH Center for Structural Biology.

Glyco is the suffix used to indicate carbohydrates attached to other molecules. Reinhold is a world-renowned expert in the field of glycomics, which seeks to understand the function of these carbohydrate attachments. He said UNH has already signed a non-disclosure agreement with a company interested in developing his invention. “The GlycoTrap would be something that everyone working in this area would love to have,” said Reinhold, also a professor of molecular biology, biochemistry and chemistry at UNH. “First, the device has to be packaged so it can be easily marketed.”

Genomic studies have determined the entire sequence of DNA in humans, but genes are only the blueprints for proteins, the chemical messengers that direct the actual work in the body. So to understand how genes give rise to function, researchers began looking at proteins, an endeavor dubbed proteomics. They soon discovered that the instructions carried by most proteins were altered by the addition of carbohydrates and that, without the carbohydrate, the protein could not do its job. The same was also found to be true for some fat molecules.

“So genes define function by adding carbohydrates to proteins and fats, a process called glycosylation,” explained Reinhold. “Proteins and fats are modified innumerous ways in the cell. One can do a half dozen different functions depending on which carbohydrate is added and where.”

For years, scientists thought carbohydrates did little more than provide energy for the body, but it is now known that some carbohydrates play a vital role in processes as diverse as recognizing pathogens, blood clotting and directing embryonic development. In just 10 years, 13 different genetic disorders have been linked to defects in how carbohydrates are added to other molecules.

One major advantage the GlycoTrap has over existing methods is that it can capture a complete carbohydrate, not just pieces. It can also be used with the robotic procedures currently employed in the study of proteins. The GlycoTrap also purifies the carbohydrate. “It can remove the

background material in a biological sample,” said Reinhold, “which is extremely important for sensitivity and getting the molecules you are interested in.”

Understanding the details of carbohydrate structure will give pharmaceutical companies new targets for drug development. “They are extremely important in unraveling the fine tuning of cellular processes,” said Reinhold of carbohydrates. “You can’t make improved drugs with inherent specificity until you learn what’s there in normal and abnormal cases.”

Glycomics, however, is still in its infancy. While there are relatively few simple sugars, the multi-branched carbohydrate “bushes” they form are mind-bogglingly complex compared to the linear chains formed by DNA or proteins, and they can come in millions of different configurations. “The complexity is so great,” said Reinhold. “Carbohydrates will impose difficult barriers to climb before we can fully define cellular function. The GlycoTrap is one step in a long process.”

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